

4.2.7 Sector Measure

Name: _____ Class: _____ Date: _____

KEY WORDS sector

<!-- Session 2 native-skill companion -->

Objective

Practise sector measure within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Arcs, sectors and reverse angle calculations · Foundation

For an angle θ in degrees, fraction of a turn is $\theta/360$. Arc length is this fraction of $2\pi r$ and sector area is this fraction of πr^2 . Sector perimeter adds the two radii. Rearrange the same fraction to recover an angle from an arc or an area. Keep degree and length units separate.

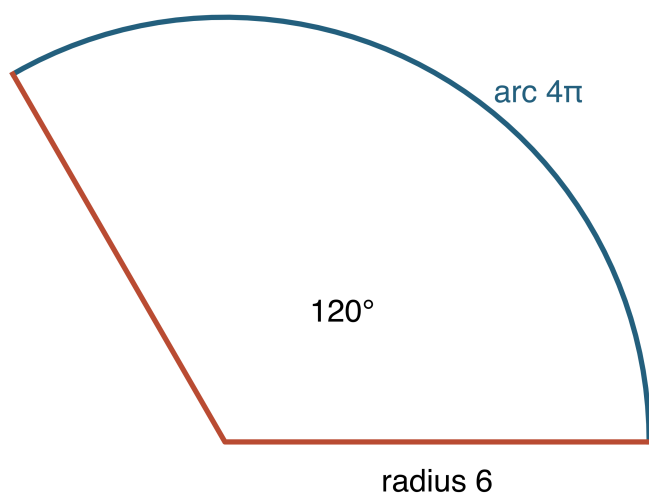
$$s = \frac{\theta}{360^\circ} 2\pi r, \quad A = \frac{\theta}{360^\circ} \pi r^2$$

At $r=6$ cm and $\theta=120^\circ$, the fraction is $1/3$: arc is 4π cm, area is 12π cm² and perimeter is $4\pi+12$ cm. If another $r=6$ sector has area 9π cm², its fraction is $9\pi/36\pi=1/4$ and angle is 90° . If its arc instead measures 3π cm, its fraction is $3\pi/12\pi=1/4$, giving the same angle. A full 360° sector has the whole circle area, while the circle boundary has no extra radii. A 60° sector of radius 3 has area $(1/6)\times 9\pi=1.5\pi$ cm².

An arc length is not a sector perimeter. Use the angle as a fraction of 360° , not 180° . Radius is squared only for area, not arc length.

AQA G18 includes arc lengths, sector angles and areas in degree-based geometry. Show the full-circle quantity and fraction before multiplying, then check that the result fits the angle.

One third of a turn: sector area 12π



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) For $r=6, \theta=120^\circ$, find the coefficient of π in arc length.

2.2 (Foundation) Find the coefficient of π in its area.

2.3 (Foundation) Find θ for $r=6$ sector area 9π .

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A sector's arc length and perimeter are always the same.

Solutions

2.1 $(120/360) \times 2 \times 6 = 4$.

2.2 $(120/360) \times 6^2 = 12$.

2.3 $9/36$ of a turn: $360 \times 1/4 = 90^\circ$.

3.1 False. A radius-6 sector with angle 120° has arc length 4π . Its perimeter adds two radii and is $4\pi + 12$.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.